Fuel Cycle Facility Comments on NRC Draft Paper "NRC Staff Considerations on a Comparison of Integrated Safety Analysis to Probabilistic Risk Assessment"

1. Since the staff will present the paper to the ACRS and make it publicly available, industry suggests that, for clarity, the staff provide two distinct comparisons of the ISA and PRA methodologies.

    a. The first comparison should focus on the purpose, objectives and capabilities of both ISA and PRA methodologies in support of establishing the safety basis and demonstrating compliance with the regulations governing power reactors and fuel cycle facilities. This comparison should conclude with definitive statements as to how each method is currently used to establish an appropriate safety basis for licensed facilities and demonstrate compliance with applicable requirements. Specifically, the ISA methodology, as implemented by fuel cycle facilities today, can and has been demonstrated to provide the required safety basis and compliance with applicable requirements.

    b. The second comparison should focus on how the ISA and PRA methodologies could support an enhanced Fuel Cycle Oversight Process (FCOP). The comparison should recognize that the specific elements of a revised oversight process have not yet been determined. Thus, it is conceivable that an enhanced oversight process could be appropriately informed by an ISA; however, deliberative discussions with industry would be needed to inform such a decision. Such an evaluation should also include consideration of a thorough cost benefit analysis comparing the two methodologies because of the low accident source term characteristics of fuel cycle facilities and the significant complexity of PRA techniques.

2. Regarding the first comparison described above, it should also include a brief description of the predominant hazards and relative risks associated with power reactors and fuel cycle facilities. Specifically, the risk posed from the large radiological source term (i.e. significant quantities of fission products) and long term high energy source associated with a power reactor has the potential to affect large populations surrounding the reactor site, whereas the risk posed from hazardous chemicals or fissionable materials associated with a fuel cycle facility is typically limited to workers located within the boundaries of the site. In that regard, industry suggests that staff include and support the conclusions of the International Atomic Energy Agency in its reporting scale for nuclear and radiological events where the risk from fuel facilities is considered to be three orders of magnitude below that of nuclear power reactors.

3. The paper should also include a discussion of the relatively simple and independent safety controls (e.g., safe geometry, safe mass, etc.) currently utilized at fuel cycle facilities to maintain an acceptable safety basis and comply with NRC regulations as compared to the highly complex and sequentially reliant integrated safety controls (multiple power supplies,

sequential control schemes, etc.) required at power reactor plants. In other words, controls at fuel cycle facilities typically bring the process to a halt before the postulated accident sequence can progress in contrast with reactor control systems are required to operate through a failed condition to bring the reactor to a safe shutdown.

4. The paper should also acknowledge that the ISA is both a design and safety analysis methodology to assure and demonstrate that appropriate safety controls are in place to meet performance requirements intended to protect the worker, the public and the environment. It is not, as a PRA, intended to determine the overall risk of the facility or the overall risk of a fleet of facilities.

5. From industry's perspective, many of the comparisons appear to be presented in a biased manner. Although this may be unintended and a product of incorporating input from PRA experts in drafting the paper, these comparisons could be misinterpreted to indicate that the PRA process provides a greater margin of safety than does the ISA process and therefore PRA should be applied at fuel facilities. As the paper indicates, the ISA process is frequently more conservative since it, at times, assumes and relies on worst-case scenarios. Specific examples were discussed with NRC staff at the public meeting and include, but are not limited to, the following:

    a. The draft white paper suggests in the text and in Table 3 that a potential weakness of ISAs is that accident sequences could be omitted or overlooked. The paper goes on to state that PRAs typically use experienced fault practitioners to avoid improper screening of scenarios. In fact, very few PRA experts are familiar with fuel cycle facility processes, which would increase the probability that a PRA would overlook potential sequences.

    b. The draft white paper implies on two occasions that industry determines the likelihood definitions for complying with 10CFR70.61. This is factually correct, but requires NRC approval. Additionally, if definitions of likelihood differ from the NRC guidance, industry is required to provide a detailed technical basis for the deviation subject to NRC approval. This characterization could be misinterpreted to incorrectly indicate that industry independently determines the requirements.

    c. In the discussion of "End States", the paper indicates that relatively few accidents exceed consequence levels due to the distances involved to offsite persons. The lack of consequences to offsite persons is typically due to the relatively small source terms for the hazards involved rather than site boundary distances.

    d. In the section "Critical Evaluation of ISA-PRA for Compliance with 10CFR70", the paper suggests that the ISA is less rigorous and "can" produce results that are acceptable for compliance and safety. For proper perspective, ISAs "do" produce results that are acceptable for compliance and safety (given they are approved by

NRC staff for that purpose) and are not less rigorous since they are much more conservative than PRAs.

6. Overall, the information presented in Table 3 is cursory and confusing. The purpose of the table is unclear as some of the information presented in it could be easily misinterpreted, by the public and uninformed readers, to indicate that the use of ISA at fuel facilities is inadequate and lacking in some manner. This is clearly not the case as stated in other sections of the paper. Consideration should be given to, at minimum, deleting the right hand column of Table 3 or Table 3 in its entirety.

7. Finally, industry also recommends that NRC staff rely on the analysis and positions presented in the paper "Integrated Safety Analysis: Why It Is Appropriate for Fuel Recycling Facilities" which was transmitted to Ms. Catherine Haney, Director NMSS on September 10, 2010, by Rodney McCullum, NEI Director of Fuel Cycle Projects, Nuclear Generation Division. While the paper was written in support of a discussion regarding fuel recycling facilities, the issues, discussions, comparisons and conclusions presented are applicable to all fuel cycle facilities. Industry considers it to represent a well thought out and detailed comparison of the two methods, their basis, and a comparison of their strengths and weaknesses in an objective manner.